ABSTRACT

A method for presenting seismic data in a multidimensional visualization. Specifically, in the visualization technique of the current invention, seismic data is displayed in a multidimensional plan view utilizing at least four dimensions associated with the seismic data, such as for example, x, y, time/depth and offset. In the method of the invention, a plurality of time or depth windows are defined along a reflector or any other time or depth surface of interest on the prestack data as presented in standard CMP displays. In one embodiment of the invention, for each CMP gather, a window is defined around the data representing the reflector of interest. Passing through each window are individual seismic traces. The window, being defined on the seismic display, is associated with a finite time/depth segment and will contain several offsets. In addition, since each CMP gather has a constant x and y coordinate, the window is associated with specific spatial coordinates. These spatial coordinates are used to plot the window on an x-y plan view. Each window represents a segment of the seismic data associated with a reflector or other time/depth window. The data within each window can be analyzed to determine such things as, for example, the accuracy of the particular velocity model selected for data processing methods, such a migration. Furthermore, as multiple windows are plotted on the plan view, trends in the data become more prevalent to an observer. The resulting multidimensional plan view thereby permits presentation of the data utilizing at least four dimensions of the data. In another embodiment, additional information can be extracted from the multidimensional plan view by overlaying this plan view on additional representations of the data, such as for example, the underlying seismic structure. In addition, the visualization techniques could be used on poststack data to visualize several stacked traces around a point of interest.